

Listing of Claims

No amendments are made to the claims. The current status of the claims is as follows:

Claim 1 (original). A method of modeling seismic data, comprising:

deriving a time-lapse data set from a first seismic data set and a second seismic data set;

deriving a forward-modeled time-lapse data set including a plurality of values;

sorting the plurality of values into a plurality of bins corresponding to the forward-modeled time-lapse data set;

selecting a plurality of optimal values from the plurality of bins;

mapping the plurality of optimal values in correspondence with a plurality of subterranean locations using the time-lapse data set;

calibrating the plurality of optimal values; and

plotting the plurality of calibrated optimal values.

Claim 2 (original). The method of claim 1, and wherein the deriving the forward-modeled time-lapse data set is defined by deriving the forward-modeled time-lapse data set using at least one rock physics relationship.

Claim 3 (original). The method of claim 1, and further comprising acquiring the first seismic data set and thereafter acquiring the second seismic data set.

Claim 4 (original). The method of claim 1, and wherein the first seismic data set and the second seismic data set both include amplitude-versus-offset signal data.

1 Claim 5 (original). The method of claim 1, and wherein the first seismic data set and
2 the second seismic data set both include amplitude-versus-angle signal data.

3
4 Claim 6 (original). The method of claim 1, and wherein the first seismic data set and
5 the second seismic data set both include data corresponding to reflected acoustic wave
6 energy.

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8 Claim 7 (original). The method of claim 1, and wherein the deriving the forward-
9 modeled time-lapse data set is defined by deriving the forward-modeled time-lapse data
10 set using respectively selected pore pressure and saturation and porosity relationships.

11
12 Claim 8 (original). The method of claim 1, and wherein the deriving the time-lapse
13 data set is defined by calibrating each of the first seismic data set and the second
14 seismic data set and thereafter subtracting the calibrated second seismic data set from
15 the calibrated first seismic data set.

16
17 Claim 9 (original). The method of claim 1, and wherein the deriving the time-lapse
18 data set is defined by inverting and then calibrating each of the first seismic data set and
19 the second seismic data set and thereafter subtracting the calibrated inverted second
20 seismic data set from the calibrated inverted first seismic data set.

21
22 Claim 10 (original). The method of claim 1, and wherein the plotting the calibrated
23 values is defined by plotting the calibrated values to visually represent a spatial
24 distribution of at least one physical characteristic of a subterranean hydrocarbon
25 reservoir.

1 Claim 11 (original). The method of claim 1, and wherein the selecting the plurality of
2 optimal values sorted into the plurality of bins is performed in response to comparing the
3 plurality of values with at least one comparison value, and wherein the at least one
4 comparison value optionally includes a reservoir measurement value.

6 Claim 12 (original). The method of claim 1, and wherein the calibrating the plurality of
7 optimal values is performed in response to comparing the plurality of optimal values with
8 at least one comparison value, and wherein the at least one comparison value optionally
9 includes a reservoir measurement value.

11 Claim 13 (original). A method of modeling seismic data corresponding to a
12 subterranean reservoir containing hydrocarbons, comprising:

13 calibrating each of a first seismic data set and a second seismic data set;
14 subtracting the calibrated second seismic data set from the calibrated first
15 seismic data set to derive a time-lapse data set;
16 deriving a forward-modeled time-lapse data set including a plurality of physical
17 parametric values;
18 sorting the plurality of physical parametric values into a plurality of bins
19 corresponding to the forward-modeled time-lapse data set;
20 selecting a plurality of optimal physical parametric values from the plurality of bins
21 of physical parametric values;
22 mapping the plurality of optimal physical parametric values to a corresponding
23 plurality of subterranean locations using the time-lapse data set;
24 calibrating the plurality of optimal physical parametric values; and
25 plotting the plurality of calibrated optimal physical parametric values as a visual
representation of the subterranean reservoir containing hydrocarbons.

1 Claim 14 (original). The method of claim 13, and wherein:

2 the calibrating each of the first seismic data set and the second seismic data set
3 is performed in response to comparing each of the first seismic data set and the second
4 seismic data set with at least one comparison value; and

5 the at least one comparison value optionally includes a reservoir measurement
6 value.

7
8 Claim 15 (original). The method of claim 13, and wherein the first seismic data set and
9 the second seismic data are respectively defined by an inverted first seismic data set
10 and an inverted second seismic data set.

11
12 Claim 16 (original). The method of claim 13, and wherein the deriving the forward-
13 modeled time-lapse data set is defined by deriving the forward-modeled time-lapse data
14 set using a rock physics relationship.

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16 Claim 17 (original). The method of claim 16, and wherein the rock physics relationship
17 corresponds to a selected one of a pressure relationship, a saturation relationship, or a
18 porosity relationship.

19
20 Claim 18 (original). The method of claim 13, and wherein the selecting the plurality of
21 optimal physical parametric values sorted into the plurality of bins is performed in
22 response to comparing the plurality of physical parametric values with at least one
23 comparison value, and wherein the at least one comparison value optionally includes a
24 reservoir measurement value.

1 Claim 19 (original). The method of claim 13, and wherein the calibrating the plurality of
2 optimal physical parametric values is performed in response to comparing the plurality of
3 optimal physical parametric values with at least one comparison value, and wherein the
4 at least one comparison value optionally includes a reservoir measurement value.

6 Claim 20 (original). The method of claim 13, and wherein the first seismic data set and
7 the second seismic data set both include amplitude-versus-offset signal data.

9 Claim 21 (original). The method of claim 13, and wherein the first seismic data set and
10 the second seismic data set both include amplitude-versus-angle signal data.

12 Claim 22 (original). The method of claim 13, and wherein the first seismic data set and
13 the second seismic data set both include data corresponding to reflected acoustic wave
14 energy.

16 Claim 23 (original). A computer, comprising:

17 a processor;

18 a computer-readable storage medium coupled in data communication with the
19 processor, the computer-readable storage medium storing a first data set and a second
20 data set and a plurality of rock physics relationships and a program code, the program
21 code configured to cause the processor to:

22 calibrate each of the first data set and the second data set;

23 subtract the calibrated second data set from the calibrated first data set to derive
24 a time-lapse data set;

25 calculate a forward-modeled time-lapse data set including a plurality of
parametric values using selected ones of the plurality of rock physics relationships;

1 sort the plurality of parametric values into a plurality of bins corresponding to the
2 forward-modeled time-lapse data set;

3 select a plurality of optimal parametric values from the plurality of parametric
4 values sorted into the plurality of bins;

5 map the plurality of optimal parametric values to a corresponding plurality of
6 subterranean locations using the time-lapse data set;

7 calibrate the plurality of optimal parametric values; and

8 plot the plurality of calibrated optimal parametric values to visually represent at
9 least one spatially distributed physical characteristic of a subterranean reservoir of
10 hydrocarbons.

11
12 Claim 24 (original). The computer of claim 23, and wherein the first data set and the
13 second data set stored in the computer-readable storage medium both include one of
14 amplitude-versus-offset data, or amplitude-versus-angle data.

15
16 Claim 25 (original). The computer of claim 23, and wherein the first data set and the
17 second data set both include data corresponding to reflected acoustic wave energy.

18
19 Claim 26 (original). The computer of claim 23, and wherein the program code stored
20 within the computer-readable storage medium is further configured to cause the
21 processor to:

22 compare each of the first data set and the second data set with at least one
23 comparison value; and

24 calibrate each of the first data set and the second data set in response to the
25 comparing.

1 Claim 27 (original). The computer of claim 23, and wherein the first data set and the
2 second data set are respectively defined by an inverted first data set and an inverted
3 second data set.

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5 Claim 28 (original). The computer of claim 23, and wherein the plurality of rock physics
6 relationships stored in the computer-readable storage medium are defined by at least
7 one of pressure relationships, saturation relationships, or porosity relationships.

8
9 Claim 29 (original). The computer of claim 23, and wherein the program code stored in
10 the computer-readable storage medium is further configured to cause the processor to
11 compare the plurality of parametric values sorted into the plurality of bins with at least
12 one comparison value, and to select the plurality of optimal parametric values in
13 response to the comparing.

14
15 Claim 30 (original). The computer of claim 29, and wherein the at least one
16 comparison value includes a measurement value corresponding to the subterranean
17 reservoir containing hydrocarbons.

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19 Claim 31 (original). The computer of claim 23, and wherein the program code stored in
20 the computer-readable storage medium is further configured to cause the processor to
21 compare the plurality of optimal parametric values with at least one comparison value,
22 and to calibrate the plurality of optimal parametric values in response to the comparing.

23
24 Claim 32 (original). The computer of claim 31, and wherein the at least one comparison
25 value includes a measurement value corresponding to the subterranean reservoir
containing hydrocarbons.

1 Claim 33 (original). The computer of claim 23, and wherein the program code stored in
2 the computer-readable storage medium is further configured to cause the processor to
3 plot the plurality of optimal parametric values selectively using one of a monitor or a
4 printer coupled to the computer.

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6 Claim 34 (original). The computer of claim 23, and wherein the at least one spatially
7 distributed physical characteristic of the subterranean reservoir containing hydrocarbons
8 is defined by at least one of a porosity, a pressure, or a saturation.

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10 (End of claim listing.)

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